What you need to know for the test

Atomic models of Dalton, Thomson, Rutherford, Bohr and the one that you researched for your group presentation (know their experiments, their contributions, the limitations)

Quanta of energy & atomic spectra (how this helped Bohr come to his conclusions)

The quantum mechanical model of the atom (De Broglie’s & Schrödinger’s contributions)

Heisenberg uncertainty principle

The notion of wave functions and the quantum numbers describe orbitals (n, l, ml & ms)

Allowable values for quantum numbers and what the numbers stand for (be able to recognize not allowable values and explain why)

Pauli Exclusion principle and Hund’s rule - apply these to filling orbitals

Finding the total number of orbitals (n2) and the total number of electrons in an energy level (2n2)

Be able to represent electrons in orbitals with electron configurations and orbital diagram/energy level diagram (like on page 182)

Periodic table patterns (atomic radius, ionization energy, electron affinity, effective nuclear charge and the factors affecting them) and using electron configurations to explain trends and/or deviations from trends

Types of chemical bonding and the spectrum of electronegativity

Be able to use electronegativity to explain bonding and ionic character (at least know what this term means)

Be able to explain the physical properties of metals, ionic compounds, covalent compounds with respect to their bonding

Lewis structures (determine the best one for a compound), electron pair arrangement, molecular shape, determine polarity based on shape and intermolecular forces based on polarity

Be able to explain orbital hybridization (needed for lone pairs & sigma bonds) and draw orbital diagrams for this (ground, excites & hybridized states)

Valence bond theory - overlap of orbitals vs. molecular orbital theory (entirely new electron orbitals around molecule)

How do double and triple bonds occur (unhybridized p orbitals overlapping in perpendicular plane to sigma bonds)

Types of solids (including allotropes and covalent network solids - page 224-225) and the intermolecular forces that hold them together

Intermolecular forces and how they explain physical properties of compounds (be able to rank compounds with respect to their melting points, solubility, etc.)